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25944 7590 03/16/2010

OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER

RIDDLE, CHRISTINA A

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 03/16/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,836

07/18/2007

Shinichi Okita

129559

3656

TITLE OF INVENTION: ALIGNMENT CONDITION DETERMINATION METHOD AND APPARATUS OF THE SAME, AND EXPOSURE METHOD AND APPARATUS OF THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	06/16/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

25944 7590 03/16/2010

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,836	07/18/2007	Shinichi Okita	129559	3656

TITLE OF INVENTION: ALIGNMENT CONDITION DETERMINATION METHOD AND APPARATUS OF THE SAME, AND EXPOSURE METHOD AND APPARATUS OF THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	06/16/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
RIDDLE, CHRISTINA A	2882	355-053000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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25944	7590	03/16/2010	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850			RIDDLE, CHRISTINA A	
			ART UNIT	PAPER NUMBER
			2882	
DATE MAILED: 03/16/2010				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 341 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 341 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/594,836

Applicant(s)

OKITA, SHINICHI

Examiner

Christina Riddle

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments filed 12/11/2009 and 12/28/2009.
2. ☒ The allowed claim(s) is/are 1-7 and 10-16.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☒ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

/Peter B. Kim/
Primary Examiner, Art Unit 2882

DETAILED ACTION

Status

1. Acknowledgment is made of the amendment filed on 12/11/2009 which amended claims 1, 2, 10-12, 14, and 16, and cancelled claims 8 and 9. Acknowledgment is made of the supplemental amendment filed 12/28/2009, which amended claims 1, 10, and 11. Claims 1-7 and 10-16 are currently pending. This action is responsive to both the amendment filed on 12/11/2009 and the supplemental amendment filed on 12/28/2009.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 3/31/2004. It is noted, however, that applicant has not filed a certified copy of the JP 2004-105941 application as required by 35 U.S.C. 119(b).

Allowable Subject Matter

3. Claim 1-7, 10-16 are allowed.
4. The following is an examiner's statement of reasons for allowance.

Regarding claims 1 and 10, the prior art of record, either alone or in combination, fails to teach or render obvious a method for determining alignment parameters that comprises the steps of performing position measurement for sample points in each processing area under predetermined alignment parameters to obtain

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reference computation results, positioning and processing each processing area at the predetermined processing position based on the references results and measuring a first error to obtain reference processing results, changing part of the predetermined alignment parameters and measuring position of the sample points to obtain comparative computation results by using signal waveforms to change the predetermined alignment parameters to obtain multiple comparative computation results and comparing the multiple comparative computation results with the original reference computation results to select candidates of the comparative computation results based only on the comparison of the original reference results and the comparative computation results. The selected comparative computation results are then used to calculate a second processing error along with the reference computation results and the reference processing results. This limitation in combination with the other limitations of claims 1 and 20 renders the claims non-obvious over the prior art of record.

Ina et al. (US PGPub 2003/0071980, Ina hereinafter) was relied upon in the non-final rejection filed 9/11/2009. However, the limitation included in the supplemental amendment filed 12/28/2009 that recites comparing alignment measurement results with results obtained by changing alignment parameters and using only this comparison to select the alignment results obtained with changed alignment parameters to be used to calculate a processing error overcomes Ina since Ina discloses also using inspection results to determine parameter values for optimum alignment (Fig. 2, step S255 and S260). Therefore, Ina does not teach using only the measurement results and estimated measurement results as currently required by the claim limitation.

Irie et al. (US Patent No. 5,525,808, Irie hereinafter) discloses measuring wafer alignment and determining whether the signal processing conditions for detected waveforms are optimal (Fig. 15B, step 114 and Fig. 30A, step 610). However, Irie does describe selecting a condition based only on comparing the results of different signal processing conditions.

Matsumoto et al. (US PGPub 2003/0202182, Matsumoto hereinafter) discloses performing alignment measurement (AGA measurement in process 11, Fig. 2) and performing alignment measurement with different variables than the processing variable (process 12, Fig. 2). Inspection is performed by an overlay apparatus and the results of inspection and the AGA measurement are used to create a database (Fig. 2, process 15). However, Matsumoto does not describe comparing the results of the different AGA measurements and selecting AGA measurement with other job variables based only on the comparison of AGA measurements.

Oishi et al. (US PGPub 2003/0204282, Oishi hereinafter) discloses performing alignment measurement (AGA measurement in steps S102, Fig. 2B), changing alignment parameters and using the alignment signals to re-perform alignment measurement (Fig. 2B, step S103), and exposing the substrate and measuring resulting overlay (Fig. 2B, steps S104 and S106). The alignment measurement results and overlay measurement results are sent to a PC (Fig. 2B, step S107, step S201, and step S203) and an optimal parameter value is determined by predicting the inspection result for each parameter value (Fig. 2b, step S205). However, Oishi does not appear to describe determining processing errors based on the different AGA measurements and

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the inspection results and does not describe selecting job variables based only on the comparison of AGA measurements.

Nakajima (US PGPub 2004/0223157) discloses determining a mark position with different signal processing conditions (Fig. 18, step S22) and determining the differences between the different positions (Fig. 18, step S23). Based on only the comparison between different detection processing conditions, a processing condition is selected and used to perform mark alignment (Fig. 18, step S26). However, Nakajima does not appear to disclose performing position measurement for sample points in each shot on a wafer and performing inspection after exposure processing of the wafer.

Regarding claim 11, the prior art of record, either alone or in combination, fails to teach or render obvious an apparatus for determining alignment parameters comprising a reference computation result fetching means for performing position measurement for sample points in each processing area under predetermined alignment parameters to obtain reference computation results, a reference processing result fetching means for measuring a first error to obtain reference processing results after positioning and processing each processing area at the predetermined processing position based on the references results, and a comparative computation result fetching means for changing part of the predetermined alignment parameters and measuring position of the sample points to obtain comparative computation results by using signal waveforms to change the predetermined alignment parameters to obtain multiple comparative computation results and comparing the multiple comparative computation results with the original reference computation results to select candidates of the

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comparative computation results based on the residual error of the comparison of only original reference results and the comparative computation results. The selected comparative computation results are then used by a processing error calculating means for calculating to calculate a second processing error along with the reference computation results and the reference processing results. This limitation in combination with the other limitations of claim 11 renders the claim non-obvious over the prior art of record.

The dependent claims are likewise allowable by virtue of their dependency upon allowable independent claims as stated above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kobayashi et al. (US Patent No. 6,416,912) discloses changing signal waveform processing conditions to measure alignment marks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Riddle whose telephone number is (571)270-7538. The examiner can normally be reached on Monday- Thursday 7:00-17:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter B. Kim/
Primary Examiner, Art Unit 2882

/C. R./
Examiner, Art Unit 2882